Information Content of Credit Rating Affirmations

Abstract

We examine whether the reiteration of past credit ratings (i.e., credit rating affirmation) provides value-relevant information to equity analysts and stock investors. While a large body of accounting and finance research provides evidence on the informational role of credit rating downgrades and upgrades, the informational effects of credit rating affirmations remain unexplored, despite the fact that the frequency of issuing rating affirmations is 1.6 times greater than that of issuing both rating downgrades and upgrades. Using a sample of US corporate credit rating reports that reiterate the previous credit ratings over the period of April 1995-June 2018, we find that equity analysts' earnings forecast dispersion and stock return volatility—proxies for information uncertainty—decrease within a 30-day window following the credit rating affirmation announcements. The reduction in information uncertainty after rating affirmation is mainly driven by firms with non-investment grade bonds, whereas such reduction is not statistically significant for firms with investment grade bonds. We next find that the stock market reaction to affirmations is significantly positive on average and the positive reaction is most pronounced for firms with non-investment grade bonds. Taken together, our findings suggest that credit rating affirmations reduce information uncertainty and stock market investors find it useful for their investment decisions, particularly for firms with non-investment grade bonds. This study enhances our understanding of the non-trivial informational value of the credit rating affirmations for equity market participants.

Information Content of Credit Rating Affirmations

1. Introduction

While a large body of accounting and finance research provides evidence on the information content of credit rating changes (upgrades or downgrades), there is no research on the information content of credit rating affirmations (i.e., reiteration of past credit ratings). Since credit rating affirmations indicate that the credit rating on a firm's ability to pay back debt and interest remains the same as before, prior studies might have assumed that reiterations of prior credit ratings do not convey meaningful information content to capital market participants including equity analysts and stock investors. However, it is intriguing to observe that credit rating agencies issue a greater number of rating affirmations (about 62% of all credit rating announcements) than those of upgrades and downgrades, combined together. Out of the 67,555 credit rating announcements during our sample period of April 1995-June 2018, there are 41,758 rating affirmations, which are far greater than 25,797 credit rating changes combined (16,515 downgrades and 9,282 upgrades). A natural question is why the academics ignore such large number of rating affirmations. Does researchers assume that these affirmation announcements are trivial or non-informative events? We attempt to fill this gap between academic research and practices by credit rating agencies by examining whether equity analysts and stock investors find credit rating affirmations useful for their decisions.

Whether credit rating downgrades and upgrades are informative to equity investors has long been examined by both accounting and finance researchers. On the one hand, research finds that credit rating agencies have considerable privileged access to management and claim to receive private information including the issuer's acquisition, expansion, new product, and debt issuance plans (Goh and Ederington, 1993), and credit rating announcements play a significant role in stock

and bond valuations (Goh and Ederington, 1999), thus suggesting that credit ratings provide value-relevant information to capital market participants. On the other hand, some other research (e.g., Altman and Rijken, 2004; Baker and Mansi, 2002) provides evidence that credit ratings are untimely because credit rating agencies consider the stability and soundness of credit ratings to be most important, implying that credit ratings are lack of relevant forward-looking information content. Prior studies (e.g., Ederington and Goh, 1998; Holthausen and Leftwich, 1986; Jorion et al., 2005) test these two arguments based on credit rating downgrades and upgrades and find that stock market investors negatively (positively) react to downgrades (upgrades) while the magnitude of reaction is greater for downgrades than for upgrades. Taken together, the weight of evidence suggests that credit rating downgrades and upgrades are informative to investors.

However, to the best of our knowledge, there is no study on the nature of credit rating affirmations in terms of information content. Apart from being the first study on credit rating affirmation, understanding the effects of rating affirmation is consequential as the frequency of issuing rating affirmations is much higher than that of issuing both downgrades and upgrades.

In this study, we attempt to fill this void by investigating the informational effects of credit rating affirmations on equity market participants. We use change in equity analysts' earnings forecast dispersion and change in stock return volatility before and after affirmation announcements as proxies for change in information uncertainty, which is widely used in the literature (e.g., Diether et al., 2002; Zhang, 2006a; Zhang, 2006b; Moeller et al., 2007; Barron et al. 2009; Rees and Thomas 2010; and Sheng and Thevenot 2012). In line with prior literature, we require forecasts made within 90 days before the affirmation announcement and revised within 30 days after the

rating announcement.[1] As an alternative measure of information uncertainty, we use stock return volatility. Similar to the construction of earnings forecast dispersion, we measure a change in stock return volatility as the change in standard deviation of daily stock returns for 30 days prior to affirmation announcements and that for 30 days after affirmation announcements.[2] Using a sample of credit rating affirmations during April 1995-June 2018 from the Mergent Fixed Investment Securities Database (FISD), we find evidence that on average, both earnings forecast dispersion and stock return volatility are significantly reduced after affirmation announcements.

We next test whether the reduction in analysts' earnings forecast dispersion and stock return volatility after affirmation announcements is more pronounced as affirmed prior credit ratings are worse. We predict that the impact of affirmation announcements on the reduction in analysts' earnings forecast dispersion and return volatility will be greater for firms with non-investment grade bonds than for those with investment grade bonds, which presumably have less information uncertainty compared to non-investment grade bonds. We find that, compared to firms with the most favorable credit ratings (i.e., AAA and AA), firms with non-investment grades experience a greater reduction in both earnings forecast dispersion and stock return volatility after the credit rating affirmation announcements. This difference is also economically significant in that the magnitude of the reduction in earnings forecast dispersion and stock return volatility for firms with non-investment grades is 12.1 and 10.9 times larger than the magnitude of the reduction in both measures for firms with AAA and AA credit ratings, respectively.

[1] We use 90-day window prior to affirmations to increase our sample size, but our results are qualitatively similar when we use forecasts issued within 30-day window prior to credit rating affirmations instead of 90-day window. To obtain a better measure of dispersion, we require at least four observations to estimate the standard deviation.

[2] The results are similar when we use different 90 days window for measuring stock return volatility before and after affirmation announcement. One advantage of using stock return volatility is to overcome small sample size problem with earnings forecast dispersion.

We also examine the stock market reaction to rating affirmations using the 3-day cumulative abnormal returns around affirmation announcements. If rating affirmations do not provide any incremental information, we expect that stock investors do not react to affirmation announcements. In contrast, if rating affirmations are informative, stock investors would react to affirmation announcements. We find that on average, the stock market reaction to affirmations is significantly positive, suggesting that investors view rating affirmations favorably. Motivated by prior research (e.g., Jorion and Zhang 2007), we further examine whether stock investors' reactions to affirmation announcements are different, depending on prior credit ratings. Consistent with our main findings that the reduction in information uncertainty is most pronounced for firms with non-investment grade bonds, we find that the stock market reaction is significantly positive only for firms with non-investment grade credit ratings, whereas stock market reaction to other firms with investment grade ratings is not statistically significant. The difference in the stock market reaction to affirmations between the most favorable credit ratings and non-investment credit ratings is on average 0.64% for the three days around affirmation announcement, which appears to be economically significant.

Finally, in order to understand the sources of positive stock market reaction to credit rating affirmation announcements, we examine how affirmations affect earnings forecast revisions. Standard dividend discount model predicts that positive stock market reactions to an economic event would be due to an increase in future cash flows (i.e., the numerator effect of standard dividend discount model) and/or a decrease in discount rate (i.e., the denominator effect of standard dividend discount model). If positive stock market reaction to affirmation announcements is due to earnings forecast revisions, we expect positive earnings forecast revisions to affirmation announcements. However, we find that on average, rating affirmations are associated with negative

earnings forecast revisions,[3] suggesting that positive stock market reactions to rating affirmation announcements is more likely due to the reduction in information uncertainty (i.e., the denominator effect) and less likely due to positive earnings forecast revisions (i.e., the numerator effect).

We perform several robustness checks. First, we directly examine how the change in earnings forecast dispersion is associated with stock market reactions to rating affirmations in order to understand whether our findings on the positive stock market reactions to affirmation announcements is due to the reduction in information uncertainty. We find that stock market reaction to affirmations is significantly positively associated with earnings forecast revision and negatively related to change in earnings forecast dispersion as well as change in return volatility. This suggests that our results are driven by affirmations reducing information uncertainty of firms' future payoff, particularly with regard to discount rate news.

Second, in all analyses, we exclude affirmation announcements made during management earnings forecast and earnings announcement periods since such events can also affect firms' information environment including information uncertainty. Thus, our results are less likely due to concurrent management earnings forecast or earning announcement events around rating affirmation announcements.

Third, to rule out the possibility that our results are driven by rating watches or outlooks, we also perform our analysis with excluding affirmations with credit watches. We find that our results are robust to excluding such observations.

[3] One plausible explanation for this result is that rating affirmations contribute to correcting equity analysts' optimism in their earnings forecasts.

Fourth, we also use the absolute value of *CAR(-1,1)* as an alternative dependent variable to measure the extent of information content (e.g., Cready and Hurtt 2002) and find that the coefficient on *DMM*4 is significantly positive, suggesting that the information content of affirmations is greater for the worst credit ratings compared to the most favorable credit ratings. In summary, the additional results corroborate our main findings that credit rating affirmations, particularly for firms with non-investment grade bonds, are useful for equity analysts and stock market investors, because rating affirmations reduce such firms' information uncertainty.

We contribute to the prior literature on information content of credit ratings, including Ederington and Goh (1998), Holthausen and Leftwich (1986) and Jorion et al. (2005) in two ways. First, we shed lights on the previously unexplored area in credit rating literature (i.e., credit rating affirmations). That is, the extant research has not provided any evidence on whether and how the announcements of credit rating affirmations affect information uncertainty about firms' future payoffs, for equity analysts and stock investors. Our paper attempts to fill this void and provides novel evidence on the information role of credit rating affirmations. Second, we contribute to the literature on the value of confirming prior information, for example, Clement et al. (2003) who examine the reiteration of management guidance. By using a sample of rating affirmations which prior studies generally ignore with implicit assumption that affirmations do not contain any information content, we show that the reiteration of prior credit ratings is significantly associated with positive stock market reaction which is due to the reduction in information uncertainty and that those associations are significantly influenced by prior credit ratings.

The remainder of the paper is organized as follows. In Section 2, we discuss relevant credit rating research and develop our hypotheses. Section 3 describes the data and the construction of

the main variables. Section 4 presents the research design, the descriptive statistics, and the main empirical results, and Section 5 shows several robustness checks. Section 6 concludes.

2. Literature Review and Hypothesis Development

Credit rating change announcements

Rating agencies claim to receive inside information, such as minutes of board meetings, profit breakdowns by product, and new product plans, unavailable to other market participants (Ederington and Yawitz, 1987). To test this claim, prior research investigates informational effects of credit (or bond) rating downgrades and upgrades (e.g., Holthausen and Leftwich 1986; Jorion et al., 2005). For example, using a sample of 637 credit rating changes by Moody's and S&P, Holthausen and Leftwich (1986) find that rating downgrades are associated with negative abnormal stock returns around the two-day window beginning the day of the press release by the rating agencies. Hand et al. (1992) examine whether bond prices react to credit rating downgrades and upgrades. They show that average (median) excess bond return is -1.27% (-0.45%) to credit rating downgrades from Moody's and S&P and bonds with non-investment grades react more negatively to rating downgrades compared to investment grade bonds. The mean and median excess bond returns are about 0.35% to credit rating upgrades from Moody's and S&P. Recently, Jung et al. (2016) examine how equity analysts react to credit rating downgrades and upgrades and show that equity analysts tend to revise their earnings forecasts downward (upward) after credit rating downgrades (upgrades).

Jorion et al. (2005) investigate the informational effects of Regulation FD (Reg FD) on credit rating changes. Reg FD prohibited selective disclosure to a few privileged parties including equity analysts. However, Reg FD excludes credit rating agencies from its scope, thus, after Reg

FD was put in place, credit analysts have relative information advantage over other parties such as equity analysts since credit analysts have access to private information such as board of directors' meeting minutes, or corporate strategy plan. Given the informational advantage of credit analysts, the rating changes can be more informative in the post Reg FD period. Consistent with this chain of reasoning, Jorion et al. (2005) find the increased information content of credit rating changes in the post Reg FD period.

The effect of affirmation announcements on information uncertainty

While prior research mostly focuses on the information content of credit rating changes, our knowledge is limited as to whether credit rating affirmation reports have information that is useful to equity market investors. According to Moody's,[4] an '*Affirmation*' is defined as a public statement that the current credit rating assigned to an issuer or debt obligation, which is not currently under review, continues to be appropriately positioned. An '*Affirmation*' is generally issued to communicate raters' opinion that a publicly visible credit development does not have a direct impact on an outstanding rating. Thus, affirmations are designed to confirm prior ratings, suggesting that affirmations are not supposed to change capital markets' expectation about future cash flows. However, although credit rating affirmations may not change the expectation about future cash flows, they can be informative to investors if they can reduce the information uncertainty in bond ratings.[5] Thus, if credit rating affirmations reduce information uncertainty which equity market participants face with respect to issuers' creditworthiness, stock investors will perceive credit rating affirmations favorably. In this case, we expect stock market reaction to affirmation announcements to be significantly positive. In contrast, if affirmation announcements do not affect

[4] https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_79004

[5] Most of affirmation reports by Fitch are issued as part of its routine review. Our results are robust to the exclusion of Fitch credit rating affirmations.

information uncertainty and thus, are not informative, there will be no stock market reaction to affirmation announcements. This leads to our first set of hypotheses, stated in alternative form:

H1a: *Credit rating affirmations reduce information uncertainty of equity market participants.*
H1b: *Credit rating affirmations lead to positive stock market reaction.*

The effect of affirmation announcements on information uncertainty for non-investment grade

Next, we examine when rating affirmations reduce information uncertainty to a larger extent. We are particularly interested in the effect of prior credit ratings to affirmation announcements since affirmations basically reiterate prior credit ratings. We hypothesize that the effect of affirmations on a change in information uncertainty should be distinct between low-rated and high-rated firms due to the following reason. Jorion and Zhang (2007) find that informational effects of credit rating change announcements are greater for low-rated firms relative to high-rated firms. They find that after controlling for credit rating changes, the magnitude of stock market reaction to downgrades and upgrades is stronger as prior credit ratings are worse, suggesting that prior credit rating is a significant factor in determining the informativeness of credit rating changes. While they don't directly examine the relation between the level of prior credit ratings and change in information uncertainty after credit rating change announcement, a plausible explanation for their results would be that information uncertainty prior to bond rating changes is reduced to a larger extent when prior credit ratings are worse. Our research setting allows us to directly address the validity of this explanation since our analysis is solely based on affirmation sample, which by nature controls for the magnitude of credit rating changes. In addition, Cheng and Subramanyam (2008) document that analyst coverage is higher for firms with more favorable credit ratings. Following Cheng and Subramanyam (2008), we presume that equity analysts are less likely to follow firms with worse credit ratings and therefore predict that the role of rating affirmations in terms of

the reduction in information uncertainty is greater for low-rated firms. Again, if rating affirmations reduce information uncertainty for worse credit ratings to a larger extent than for more favorable credit ratings, we expect stock market reaction to affirmation announcements to be more positive for worse credit ratings. This leads to our second set of hypothesis, stated in alternative form:

H2a: *Credit rating affirmations reduce information uncertainty to a larger extent for firms with worse credit ratings.*

H2b: *The positive stock market reaction to credit rating affirmations is stronger for firms with worse credit ratings.*

3. Sample Selection and Variable Definitions

3.1. Sample selection

We obtain bond rating announcements from the Mergent Fixed Investment Securities Database (FISD). The database contains detailed information on bond ratings from S&P, Moody's, Fitch, and Duff & Phelps.[6] Our initial sample consists of all bond rating announcements from April 1995 — when Mergent FISD started covering corporate bonds—to June 2018, the latest available date of the database.

Table 1 provides the sample selection details. Following prior studies (e.g., Jorion et al., 2005; Jung et al., 2016), we exclude the following bonds from our sample: (i) Yankee bonds, (ii) bonds which are denominated in a foreign currency, (iii) bonds issued through private placement, (iv) bonds which can be converted to common stock, and (v) subsidiary and subordinated bonds. We keep the observations with the largest offering amount, if multiple rating announcements are made on the same day. After these screenings and excluding rating upgrades and downgrades, we obtain 41,758 affirmation observations. Next, we merge our sample with the Compustat, CRSP,

[6] Fitch acquired Duff & Phelps Credit Rating Co. on March 8, 2000 and thus, the FISD eliminated the use of Duff & Phelps name in credit rating.

and I/B/E/S databases to get financial information, stock price data, and analysts' earnings forecast data, respectively. These data restrictions significantly reduce our sample to 9,429 observations. We then exclude observations that do not have available data for control variables, observations whose affirmation announcement dates are identical to earnings announcements and/or management earnings forecasts, and observations whose stock price is smaller than $1. This set of sample selection criteria results in 8,443 firm-year observations. Finally, when we test using a change in analyst earnings forecast dispersion which requires at least four earnings forecasts issued within 90 days before and 30 days after a rating affirmation, the sample size is further reduced to 3,404 firm-year observations.

3.2. Variable definitions

To measure change in information uncertainty around credit rating affirmations, we use both change in equity analysts' forecast dispersion and change in stock return volatility. In the prior literature, analyst forecast dispersion and stock return volatility are widely used to measure the uncertainty about future earnings or the degree of consensus among equity analysts, and the degree of consensus among equity market investors (e.g., Barron et al., 2009; Rees and Thomas, 2010; Zhang, 2006a). We measure the change in financial analysts' earnings forecast dispersion (*Chg_Dispersion*) as the change in standard deviation of analysts' individual forecasts of year t+1 earnings before and after the credit rating affirmations scaled by the stock price. In calculating earnings forecast dispersion, we use forecasts issued within 90-day window prior to credit rating affirmation announcements and within 30-day window following the rating affirmations and measure change in earnings forecast dispersion before and after affirmations, respectively (Bozanic and Thevenot 2015; Rees and Thomas 2010). If a single analyst provides multiple forecasts in pre-(post-) affirmation window, we use only the last (first) available forecast. Similarly, we measure

change in stock return volatility (*Chg_RetVol*) as change in standard deviation of daily stock returns over 30 days before and after the rating affirmations.

We use the following indicator variables for prior credit ratings to take into account potential non-linear relations between credit ratings and variables of our interest: *DMM1* through *DMM4*. Our classification is also similar to the classification scheme in prior research (e.g., Jorion et al., 2005). *DMM1* is an indicator variable that equals one if credit ratings are AAA and AA from S&P, Aaa and Aa from Moody's, AAA and AA from Fitch or Duff and Phelps, and 0 otherwise. *DMM2* is an indicator variable that equals one if a credit rating is A from S&P, Moody's, Fitch or Duff and Phelps, and 0 otherwise. *DMM3* is an indicator variable that equals one if a credit rating is BBB from S&P, Baa from Moody's, BBB from Fitch or Duff and Phelps, and 0 otherwise. *DMM4* equals 1 if a credit rating is below BBB from S&P, below Baa from Moody's, below BBB from Fitch or Duff and Phelps, and 0 otherwise. We are particularly interested in *DMM4* since it indicates non-investment grades. Appendix I shows how we classify the credit ratings across different rating agencies.

4. Results

4.1. Descriptive statistics

Panel A of Table 2 provides descriptive statistics for variables of our interest. The average *CAR* (-1,1), stock market reaction around affirmation announcements is 0.12%, suggesting that the stock market reaction to affirmations is on average positive, but economically trivial. The average change in analyst forecast dispersion after rating affirmation is -0.0005, while the median is -0.0002. The mean and median changes in stock return volatility are -0.0006 and -0.0004, respectively. These results suggest that credit rating affirmations reduce both analyst forecast dispersion

and stock return volatility which are our proxies for information uncertainty. About 7.07% of credit rating affirmations belong to the most favorable prior credit rating group - *DMM1* (i.e., AAA and AA or Aaa and Aa), while 33.38% of affirmations belong to *DMM2* (i.e., A). The next group, *DMM3* (BBB or Baa) consists of 41.21% of affirmations and 18.35% of affirmations are the worst prior credit rating group - *DMM4* (i.e., non-investment grades). The average value of *MTB* in our sample is 2.71, indicating that on average, the market value of equity for our sample firms is about 2.71 times of book value of equity. The average leverage is 0.31, indicating that about one third of total assets consists of debt in our sample. The sample firms are covered by a large number of analysts, with either average or median firm covered by 22 equity analysts (*ANA_COV*). The mean and median distance in days between two credit rating announcements (*DISTANCE*) is 60 days (= exp(4.0874) and 99 days (= exp(4.5951)). 10.84% of rating affirmations follow prior rating down-grades (*PRIOR_DNG*), while 7.07% follow prior rating upgrades (*PRIOR_UPG*). About 2.80% of credit rating affirmations are accompanied with negative credit watch (*WATCH_NEG*), while 0.84% of credit rating affirmations are accompanied with positive credit watch (*WATCH_POS*). That is, only 3.64% of credit rating affirmations are announced with credit watch information in their re-ports. The mean (median) absolute value of cumulative market-adjusted returns over the window from one day after prior credit rating announcement date before a rating affirmation to one day before the rating affirmation (*ABS_PRE_CAR)* is 0.1597 (0.0796).

Panel B compares various firm characteristics between affirmations with prior investment grade (*DMM1*, *DMM2*, and *DMM3*) ratings with those with prior non-investment grade (*DMM4*) ratings. Relative to investment grade affirmations, the magnitude of stock market reaction around non-investment grade affirmation (*CAR (-1,1)*) is much higher (0.04% vs. 0.46%), suggesting that non-investment grade affirmation announcements are more favorably viewed by equity market

investors.[7] Consistent with our prediction, both change in earnings forecast dispersion (*Chg_Dispersion*) and change in return volatility (*Chg_RetVol*) are more negative in the non-investment grade sample, suggesting that credit rating affirmations reduce information uncertainty to a larger extent for firms with non-investment grade ratings. We also find that firms with investment grade affirmations tend to be larger, growing, and covered by more stock analysts and have less debt. The proportion of affirmations following prior rating downgrades (*PRIOR_DNG*) and prior rating upgrades (*PRIOR_UPG*) are significantly larger in non-investment grade affirmations compared to investment grade affirmations. In addition, the percentage of affirmations with credit rating watch (*WATCH_NEG* and *WATCH_POS*) is larger for non-investment grade than investment grade.

Table 2 Panel C provides the distribution of rating affirmations by credit rating agency. Since the sample size is smaller for the dispersion sample, we report the distribution for both dispersion and return volatility sub-samples. We find that in both samples, Fitch Service provides the most credit rating affirmations. More than 70% of affirmations are provided by Fitch Service in both the dispersion and return volatility samples.

Table 3 reports correlation results among variables of our interest. We first find that *CAR* (-1,1) is negatively correlated with both *Chg_Dispersion* and *Chg_RetVol* although its correlation with *Chg_Dispersion* is not significant, suggesting that when affirmations increase (decrease) information uncertainty, the stock market reaction to affirmation announcements decreases (increases). We also find that *Chg_Dispersion* is significantly positively correlated with *Chg_RetVol* (p-value <0.01), suggesting that our two proxies for information uncertainty—change in analysts'

[7] The untabulated t-statistics for difference test between investment grade and non-investment grade is 3.69, which indicates 1 percent significance level.

forecast dispersion and change in stock return volatility—capture a similar construct. However, its correlation coefficient (0.08) indicates that these two measures capture distinct aspects of information uncertainty. We also find that the correlation between *Chg_Dispersion* and *DMM4* is only significant and negative, preliminarily suggesting that analyst forecast dispersion is significantly reduced for firms with non-investment grade credit ratings after affirmation announcements. There is no such significant and negative correlation for all other groups - *DMM1*, *DMM2*, and *DMM3*. We also find a similar pattern for change in stock return volatility. Only the correlation between *Chg_RetVol* and *DMM4* is significant and negative. Consistent with these results, *CAR* (-1,1) is significantly positive only for *DMM4*, suggesting that stock market reaction to affirmation announcements is significantly positive only for non-investment grade.

Chg_Dispersion is significantly positively (negatively) associated with *MTB* and *ANA_COV* (*LEV*, *BIG*, *PRIOR_DNG,* and *ABS_PRE_CAR*), suggesting that a decrease in earnings forecast dispersion is smaller for firms with greater investment opportunities and greater analyst coverage while it is larger for firms with higher leverage, affirmations by S&P or Moody's (*BIG*), affirmations after prior downgrades (*PRIOR_DNG*), and firms with more news between the affirmation and previous rating announcement (*ABS_PRE_CAR*). The correlation results based on *Chg_RetVol* are generally similar to those based on *Chg_Dispersion.*

4.2. The effect of affirmations on change in information uncertainty

Table 4 shows the mean and median changes for information uncertainty around credit rating affirmations. Panel A presents the results based on the change in analysts' earnings forecast dispersion after affirmations. The change in earnings forecast dispersion around affirmations is significantly negative, with the mean (median) of -0.050 (-0.015), consistent with the first hypothesis that credit rating affirmations reduce information uncertainty of equity market participants.

Further analysis shows that the mean change in earnings forecast dispersion around rating affirmation is significantly negative in *DMM2*, *DMM3* and *DMM4* while the mean change in forecast dispersion is not significant in *DMM1*. The median change in forecast dispersion around rating affirmation is significantly negative in all categories. Both mean and median changes in earnings forecast dispersion are monotonically more negative as prior credit ratings are worse. For example, the median change in earnings forecast dispersion is -0.008, -0.011, -0.018, and -0.047 for *DMM1*, *DMM2*, *DMM3* and *DMM4*, respectively. There are significant differences in mean and median values between *DMM4* and all other three groups of prior credit ratings. These results support our second hypothesis that rating affirmations for firms with non-investment grades reduce information uncertainty to a larger extent compared to firms with investment grades.

Panel B shows the results when the change in stock return volatility is used as a proxy for information uncertainty. Consistent with the result using earnings forecast dispersion, a change in return volatility around rating affirmation is significantly negative, with the mean (median) value of -0.056 (-0.039), implying that affirmations significantly reduce information uncertainty. Further analysis shows that the mean change in return volatility around affirmation announcements is significantly negative for *DMM3* and *DMM*4. The median change in return volatility around affirmation announcements is also significantly negative for *DMM3* and *DMM4*. There are significant differences in the mean and median values between *DMM4* and the other three categories of prior credit ratings. These results are similar to those based on the change in earnings forecast dispersion, supporting our second hypothesis that credit rating affirmations reduce information uncertainty to a larger extent for firms with worse credit ratings.

4.3. Multi-variate tests for the effect of affirmations on change in information uncertainty

We further test whether the extent of information uncertainty is reduced more significantly for non-investment grades after rating affirmations based on multivariate tests. Specifically, we estimate the following regression models:

$$\begin{aligned}\Delta\ \textit{Information Uncertainty} = {} & \partial_0 + \partial_1 DMM2 + \partial_2 DMM3 + \partial_3 DMM4 + \partial_4 SIZE_{it} + \partial_5 MTB_{it} \\ & + \partial_6 LEV_{it} + \partial_7 ANA\_COV_{it} + \partial_8 DISTANCE_{it} + \partial_9 BIG_{it} \\ & + \partial_{10} PRIOR\_DNG_{it} + \partial_{11} PRIOR\_UPG_{it} \\ & + \partial_{12} WATCGH\_NEG_{it} + \partial_{13} WATCH\_POS_{it} \\ & + \partial_{14} ABS\_PRE\_CAR_{it} + \textit{Industry Fixed Effect} + \textit{Year Fixed Effect} \\ & + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned}\Delta\ \textit{Information Uncertainty} = {} & \partial_0 + \partial_1 DMM4 + \partial_2 SIZE_{it} + \partial_3 MTB_{it} + \partial_4 LEV_{it} \\ & + \partial_5 ANA\_COV_{it} + \partial_6 DISTANCE_{it} + \partial_7 BIG_{it} + \partial_8 PRIOR\_DNG_{it} \\ & + \partial_9 PRIOR\_UPG_{it} + \partial_{10} WATCGH\_NEG_{it} + \partial_{11} WATCH\_POS_{it} \\ & + \partial_{12} ABS\_PRE\_CAR_{it} + \textit{Industry Fixed Effect} \\ & + \textit{Year Fixed Effect} + \varepsilon_{it} \end{aligned} \quad (2)$$

For firm *i* and year *t*, change in information uncertainty (*Δ Information Uncertainty*) is either a change in earnings forecast dispersion (*Chg_Dispersion*) or a change in return volatility (*Chg_RetVol*). We decile-rank *Chg_Dispersion* and *Chg_RetVol* to mitigate the effect of outliers on our results and to readily assess the economic significance of our results.[8]

We include control variables that are known to affect a firm's information uncertainty. We include firm size (*SIZE*), since prior literature documents that large firms tend to have better information environment. Leverage (*LEV*) and market-to-book ratio (*MTB*) are controlled for since firms' information environment is affected by their debt level and growth potential. Analyst coverage (*ANA_COV*) is included to control for the extent of a firm's information environment affected by equity analysts' activities. We expect that the effect of a rating affirmation on a change in information uncertainty is weaker for firms followed by more equity analysts since firms with

[8] We have qualitatively similar results when using continuous variables without decile-ranking.

greater analyst coverage tend to have better information environment. We also include a control for distance in days between two adjacent rating announcements (*DISTANCE).* To control for the effect of the size and reputation of credit rating agencies in our regression model, we include a variable, *BIG* since equity market participants may be more responsive to rating announcements by big credit rating agencies such as S&P and Moody's. Both *PRIOR_UPG* and *PRIOR_DNG* are added to our regression models. *PRIOR_UPG* (*PRIOR_DNG*) equals one if the prior credit rating announcement to rating affirmation is an upgrade (downgrade), and zero otherwise. We expect rating affirmations to more reduce information uncertainty when prior credit ratings are either upgrades or downgrades, particularly downgrades, compared to when prior credit ratings are affirmations. We also take into account whether a credit rating affirmation is accompanied with negative or positive credit watch since these credit watches may provide additional information content to rating affirmations themselves. We next add a variable, *ABS_PRE_CAR* to control for the extent of new event-based information between affirmation announcement and previous rating announcement. It is measured as the absolute value of cumulative market-adjusted stock returns over the window from a day after the last rating announcement date prior to a rating affirmation to one day before the rating affirmation.

Finally, we include industry fixed effects (based on Fama-French 48 industry classifications) to control for unobserved time-invariant cross-sectional variations in the information uncertainty proxies across industries, and year fixed effects to control for systematic period effects such as differences in macroeconomic conditions that may affect all sample firms' information environment. Since observations are aggregated at the firm level, we examine the statistical significance of coefficients using standard errors adjusted for heteroskedasticity and within-firm clustering,

which takes into account serial correlation of observations within a firm (Petersen, 2009). All continuous variables are winsorized at the 1% and 99% level to mitigate the effect of outliers on our results.

Panel A of Table 5 presents the results of estimating equations (1) and (2) when information uncertainty is measured by the change in analysts' earnings forecast dispersion. In the first column, we only include three indicator variables of prior credit ratings to rating affirmations (i.e., *DMM2, DMM3,* and *DMM4*). We find that only *DMM4* is significantly negatively associated with the change in analyst forecast dispersion (p-value = 0.01). Our results are also economically significant. The coefficient on *DMM4* is -0.7773, indicating that rating affirmation reduces earnings forecast dispersion of speculative graded firms by 77.73%. In the second set of the results with control variables, *DMM4* is still significantly negatively related to the change in analyst forecast dispersion. The magnitude of the coefficient on *DMM4* (= -0.6642) is still economically meaningful.

In columns 3 and 4, we estimate the equation (2) which includes only *DMM4* instead of three dummy variables used in the equation (1) to examine whether and how the effect of affirmation reports for non-investment grade bonds are different from those of affirmation reports for investment grade bonds. Thus, the coefficient on *DMM4* indicates the change in earnings forecast dispersion of non-investment grade, relative to that of investment grade. Results in column 3 are based on the equation (2) without control variables. We find that the coefficient on *DMM4* is significantly negative, suggesting that the reduction in earnings forecast dispersion after rating affirmations is greater for firms with non-investment grade credit ratings. The results of estimating the equation (2) with control variables are reported in the column (4) and qualitatively similar to those reported in the column (3). Panel B contains the results based on the change in return volatility after affirmations as a dependent variable instead of change in earnings forecast dispersion. We

find that these results are qualitatively similar to those based on the change in earnings forecast dispersion in Panel A.

4.4. Stock market reaction to rating affirmation announcements

In this section, we investigate the stock market reaction around credit rating affirmations for each prior rating category from *DMM1* through *DMM4*. Since information uncertainty is more significantly reduced for non-investment grades, we predict that stock market reaction to rating affirmations is more significantly positive for non-investment grades. First, Panel A of Table 6 shows stock market reaction to rating affirmations for *DMM1* through *DMM4* separately. The stock market reacts insignificantly to rating affirmations in *DMM1*, *DMM2*, and *DMM3*, while the mean stock market reaction to rating affirmations in *DMM4* is significantly positive (*CAR* = 0.46%). The results also show that the mean stock market reaction between *DMM4* and other three prior rating categories are significantly different from each other. Inferences based on the median values are similar to those based on the mean values.

Table 6 Panel B reports the results on the effect of credit rating affirmations on 3-day stock market reaction around affirmation announcements in a regression framework. Specifically, we estimate the following regressions:

$$\begin{aligned} CAR\,(-1,1) = {} & \partial_0 + \partial_1 DMM2 + \partial_2 DMM3 + \partial_3 DMM4 + \partial_4 SIZE_{it} + \partial_5 MTB_{it} + \partial_6 LEV_{it} \\ & + \partial_7 ANA\_COV_{it} + \partial_8 DISTANCE_{it} + \partial_9 BIG_{it} + \partial_{10} PRIOR\_DNG_{it} \\ & + \partial_{11} PRIOR\_UPG_{it} + \partial_{12} WATCGH\_NEG_{it} + \partial_{13} WATCH\_POS_{it} \\ & + \partial_{14} ABS\_PRE\_CAR_{it} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} CAR\,(-1,1) = {} & \partial_0 + \partial_1 DMM4 + \partial_2 SIZE_{it} + \partial_3 MTB_{it} + \partial_4 LEV_{it} + \partial_5 ANA\_COV_{it} \\ & + \partial_6 DISTANCE_{it} + \partial_7 BIG_{it} + \partial_8 PRIOR\_DNG_{it} + \partial_9 PRIOR\_UPG_{it} \\ & + \partial_{10} WATCGH\_NEG_{it} + \partial_{11} WATCH\_POS_{it} + \partial_{12} ABS\_PRE\_CAR_{it} \\ & + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{it} \end{aligned} \quad (4)$$

We show the estimation results with or without control variables. The results in the column 1 are based on the equation (3) without control variables. The coefficient on *DMM4* is significantly positive. The column 2 reports the results of estimating the model (1) with control variables. We find that the coefficient on *DMM4* is still significantly positive. Its magnitude of 0.0062 indicates that the stock market reaction to affirmations in *DMM4* is greater by 0.62%, compared to affirmations in *DMM1*. In columns 3 and 4, we estimate the equation (2) that replaces the three indicator variables (*DMM2*, *DMM3* and *DMM4*) with *DMM4* only (non-investment grade indicator). Similar to the results in columns 1 and 2, we find the coefficients on *DMM4* are significantly positive, suggesting that the stock market reacts significantly and positively to affirmation announcements for firms with non-investment grade relative to those with investment grade. Turning to control variables, the coefficient on *WATCH_NEG* is significantly negative, implying that the stock market reacts negatively to negative credit watch when it is added to the rating affirmation reports. Interestingly, the coefficient on *WATCH_POS* is not significant, suggesting that there is asymmetry in the stock market reaction between negative and positive credit watch.

4.5. Earnings forecast revision to rating affirmations

For the completeness of our analysis, in this section, we further examine how affirmation announcements affect earnings forecast revision around credit rating affirmations. Since the purpose of rating affirmations is to confirm prior credit ratings and thus affirmation announcements need not revise stock investors' expectation on future cash flows, *ex ante*, we expect that earnings forecast revisions after rating affirmations is close to zero. Interestingly, the results in Panel A of Table 7 show that, inconsistent with our expectation, earnings forecast revision on average is significantly negative for the entire sample. Specifically, the mean (median) earnings forecast revision is significantly negative at -0.231 (-0.031), implying that equity analysts tend to revise their

one year ahead earnings forecasts downward after affirmation announcements. Further analysis shows that the mean and median earnings forecast revisions are significantly negative to rating affirmations in all prior rating categories. One plausible explanation for this result is that since credit rating agencies are more conservative in terms of interpreting firm performance than equity analysts (Batta and Muslu, 2017), rating affirmations play some role in correcting equity analysts' optimism underlying their earnings forecasts.

We further examine the effect of rating affirmations on earnings forecast revisions in multi-variate analyses. Specifically, we re-estimate equations (1) and (2) after replacing a dependent variable with earnings forecast revisions instead of the change in earnings forecast dispersion. Panel B shows that in column 2, the coefficient on *DMM4* is significantly negative, suggesting that earnings forecast revisions after affirmations are significantly negative only for worse credit ratings. However, for all other columns, the coefficients on *DMM4* are not significant, implying that there is no difference in earnings forecast revision between non-investment and investment grade. These results also suggest that our results on stronger stock market reaction to affirmations for non-investment grade are not related to the difference in earnings forecast revisions between investment and non-investment grade.

5. Robustness Checks

5.1. The relation between stock market reaction and change in information uncertainty

In this section, we directly examine how change in earnings forecast dispersion as well as change in return volatility are associated with stock market reaction to credit rating affirmation announcements. Based on the standard dividend discount model, the literature generally suggests that stock market reaction to an economic event should be positively (negatively) related to an

increase in future cash flows (discount rate). For example, Clement et al. (2003) use earnings forecast revisions and change in earnings forecast dispersion as proxies for the change in future cash flows (i.e., numerator effect) and the change in discount rate (i.e., denominator effect), respectively. They claim that positive stock market reaction to events should be associated with positive earnings forecast revision and/or reduction in earnings forecast dispersion. Similar to Clement et al. (2003), we examine how stock market reaction to affirmation announcements is related to the reduction of dispersion in analysts' earnings forecasts and/or the revision in analysts' earnings forecast. To test this, we estimate the following regression models:

$$\begin{aligned} CAR\ (-1,1) = {} & \partial_0 + \partial_1 Chg\_Dispersion\_Decile_{it} + \partial_2 Revision\_Deciles_{it} + \partial_3 SIZE_{it} + \partial_4 MTB_{it} \\ & + \partial_5 LEV_{it} + \partial_6 ANA\_COV_{it} + \partial_7 DISTANCE_{it} + \partial_8 BIG_{it} + \partial_9 PRIOR\_DNG_{it} \\ & + \partial_{10} PRIOR\_UPG_{it} + \partial_{11} WATCGH\_NEG_{it} + \partial_{12} WATCH\_POS_{it} \\ & + \partial_{13} ABS\_PRE\_CAR_{it} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{it} \end{aligned} \quad (5)$$

$$\begin{aligned} CAR\ (-1,1) = {} & \partial_0 + \partial_1 Chg\_RetVol\_Decile_{it} + \partial_2 Revision\_Deciles + \partial_3 SIZE_{it} + \partial_4 MTB_{it} \\ & + \partial_5 LEV_{it} + \partial_6 ANA\_COV_{it} + \partial_7 DISTANCE_{it} + \partial_8 BIG_{it} + \partial_9 PRIOR\_DNG_{it} \\ & + \partial_{10} PRIOR\_UPG_{it} + \partial_{11} WATCGH\_NEG_{it} + \partial_{12} WATCH\_POS_{it} \\ & + \partial_{13} ABS\_PRE\_CAR_{it} + Industry\ Fixed\ Effect + Year\ Fixed\ Effect + \varepsilon_{it} \end{aligned} \quad (6)$$

Variables are as defined above and in Appendix II. We decile-rank two main variables of stock market reaction – *Chg_Dispersion* (or *Chg_RetVol*) and *Revision* to better compare the magnitudes of denominator and numerator effects on stock market reaction. It also helps to mitigate the effect of outliers on our results.

The results of estimating the equation (5) are reported in Table 8. When earnings forecast dispersion is used as a proxy for information uncertainty, we find that the stock market reaction to affirmation announcements is significantly positively (negatively) related to *Revision* (*Chg_Dispersion*), implying that stock market reaction is more positive when earnings forecast revision is more positive or a change in earnings forecast dispersion is more negative. We find similar results when we use a change in stock return volatility as a proxy for information uncertainty. In sum, we

find that stock market reaction to affirmation announcements is directly related to a change in earnings forecast dispersion after controlling for earnings forecast revision. This result suggests that our finding on the positive stock market reaction to affirmation announcements is partly due to the reduction in information uncertainty of firms' future payoff, particular with regard to discount rate news.

5.2. Results without observations with credit watch

While we control for credit watch variables in our main tests, to further rule out a possibility that our results are driven by credit watch, we check to see whether our results are robust to the exclusion of observations with negative and positive credit watch (i.e., *WATCH_NEG* and *WATCH_POS*) bundled with affirmation announcements. In our sample, only about 3.64% of rating confirmations include negative or positive credit watch. The untabulated results show that our results are robust to the exclusion of such observations, ruling out the possibility that our results are affected by affirmations with credit watch.

5.3. Results based on an alternative measure of information content

Following the literature (e.g., Cready and Hurtt 2002), as an alternative measure of information content, we also use the absolute value of *CAR* (-1, 1) as another dependent variable instead of changes in information uncertainty in the equations (1) and (2). In the first estimation, we only include indicator variables for categories of prior credit ratings. We find that *DMM2*, *DMM3* and *DMM4* are all positively related to the absolute value of CAR (-1, 1) and the coefficients show an increasing pattern from *DMM2* to *DMM4* (untabulated). When we include control variables in the equation (1), the results are qualitatively similar to those without control variables. We also use only an indicator variable of non-investment grade to replace our indicator variables of *DMM2* to *DMM4* and find that the coefficient on *DMM4* is significantly positive, consistent with the results

based on the equation (1). In summary, these results corroborate our main findings that affirmations have information that is useful to equity analysts and investors, in particular when affirmation announcements are for non-investment grade bonds.

6. Conclusion

We examine whether credit rating affirmations are informative to capital market participants, specifically sell-side equity analysts and stock investors. Prior studies mostly focus on credit rating downgrades and upgrades and thus our knowledge on the effect of rating affirmations on capital market participants' decision is limited. We attempt to fill this void by examining how rating affirmations affect information uncertainty borne by equity analysts and stock investors.

We document three important findings in this paper. We first document that *on average* the information uncertainty of equity analysts and stock investors is reduced after the announcements of credit rating affirmation. We further find that the decline in the information uncertainty gets more pronounced if rating affirmations are made for non-investment grade bonds, implying that one of the unexplored informational roles of credit rating affirmations is related to the reduction in information uncertainty. Finally, we find that stock market reaction to affirmations becomes more positive if rating affirmations are made for non-investment grade credit ratings, consistent with our previous results that the reduction in information uncertainty is stronger for firms with non-investment grade credit ratings.

We contribute to the literature in two ways. First, we fill a void in the literature on credit ratings by investigating the information role of credit rating affirmations in the capital market. While rating affirmations reiterate credit worthiness of a bond issued by a company from a credit rating agency, we show that equity analysts and stock investors view credit rating affirmations as

value-relevant information that decrease the information uncertainty of firms (particular those with non-investment grade bonds). Second, by focusing on credit rating affirmation announcements made by the third party, we expand the recent literature on the confirmation of prior information, for example, Clement et al. (2003) which examine the reiteration of prior information by managers.

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Appendix I
Classification by Credit ratings

Description	Standard & Poor's	Moody's	Fitch	Duff & Phelps	Cardinal Scale
Investment Grade					
Highest grade (DMM1)	AAA	Aaa	AAA		1
High grade (DMM1)	AA (+, none, -)	Aa (1,2,3)	AA (+, none, -)		2,3,4
Upper medium grade (DMM2)	A (+, none, -)	A (1,2,3)	A (+, none, -)		5,6,7
Medium grade (DMM3)	BBB (+, none, -)	Baa (1,2,3)	BBB (+, none, -)		8,9,10
Non-investment Grade					
Lower medium grade (DMM4)	BB (+, none, -)	Ba (1,2,3)	BB (+, none, -)		11,12,13
Speculative (DMM4)	B (+, none, -)	B (1,2,3)	B (+, none, -)		14,15,16
Poor standing (DMM4)	CCC (+, none, -)	Caa (1,2,3)	CCC (+, none, -)	CCC	17,18,19
Highly speculative (DMM4)	CC (+, none, -)	Ca	CC		20
Lower quality, no interest (DMM4)	C	C	C		21

Appendix II
Variable Definitions

Variable	Definition
Chg_Dispersion	= The change in standard deviation of equity analysts' individual forecasts of year t+1 earnings before and after the credit rating affirmations scaled by the stock price. In calculating the forecast dispersion, we use forecasts issued within 90-day window prior to credit rating affirmations and revised within 30-day window following the rating affirmations
Revision	= The change in analyst forecast consensus 90 days before and 30 days after the rating affirmations scaled by the stock price
Chg_RetVol	= The change in standard deviation of daily stock return over 30 days before and after the rating affirmations
CAR (-1,1)	= Cumulative abnormal returns over the event window from 1 day before to 1 day after the credit rating affirmations
DMM1	= 1 if the credit rating is AAA and AA (+, none, -) from S&P, Aaa and Aa (1,2,3) from Moody's, AAA and AA (+, none, -) from Fitch or Duff and Phelps, and 0 otherwise
DMM2	= 1 if the credit rating is A (+, none, -) from Standard & Poor's, A (1,2,3) from Moody's Service, A (+, none, -) from Fitch Service or Duff & Phelps, and 0 otherwise
DMM3	= 1 if the credit rating is BBB (+, none, -) from Standard & Poor's, Baa (1,2,3) from Moody's Service, BBB (+, none, -) from Fitch Service or Duff & Phelps, and 0 otherwise
DMM4	= 1 if the credit rating is below BBB (+, none, -) from Standard & Poor's, below Baa (1,2,3) from Moody's Service, below BBB (+, none, -) from Fitch Service or Duff & Phelps, and 0 otherwise
SIZE	= Log of total assets at the beginning of the year
MTB	= The ratio of market value to book value of equity at the beginning of the year
LEV	= The sum of long term debt and debt in current liabilities scaled by the total assets
ANA_COV	= The number of equity analysts following a firm
DISTANCE	= Logarithm of distance in days between a current rating affirmation announcement and prior rating announcement
BIG	= 1 if the credit rating is announced by S&P and Moody's, and 0 otherwise
PRIOR_UPG	= 1 if the prior rating to a rating affirmation is an upgrade, and 0 otherwise
PRIOR_DNG	= 1 if the prior rating to a rating affirmation is a downgrade, and 0 otherwise

WATCH_NEG	= 1 if the credit rating is accompanied with negative credit watch, and 0 otherwise
WATCH_POS	= 1 if the credit rating is accompanied with positive credit watch, and 0 otherwise
ABS_PRE_CAR	= The absolute value of cumulative market-adjusted returns over the window from a day after the last rating announcement date before a rating affirmation to a day before the rating affirmation

Table 1
Sample Selection Procedure

Selection Criteria	The Number of Rating Announcements
Bond rating announcements between 1995 and June 2018 from FISD	**996,189**
Exclude Yankee bonds; issues which are denominated in a foreign currency; bonds issued through private placement; issues which can be converted to common stock	**897,627**
Exclude subsidiary and subordinated debt	**710,424**
Exclude multiple rating announcements made on the identical date	**67,555**
Exclude upgrades and downgrades	**41,758**
Merge with COMPUSTAT, CRSP, and IBES	**9,429**
Exclude observations that are not able to estimate following variables: *SIZE, MTB, ANA_COV, DISTANCE, BIG, PRIOR_UPG, PRIOR_DNG, WATCH_NEG, WATCH_POS, FD, ABS_PRE_CAR, CAR, and Chg_RetVol*	**8,694**
Exclude affirmations announced on the date of earnings announcements and management earnings forecasts	**8,443**
Exclude observations that are not able to estimate change in analyst forecast dispersion	**3,404**

Table 2
Descriptive Statistics

Panel A: Summary statistics

Variables	N	Mean	STD	Median	25th	75th
CAR (-1,1)	8443	0.0012	0.0358	-0.0000	-0.0141	0.0154
Chg_Dispersion	3404	-0.0005	0.0046	-0.0002	-0.0009	0.0003
Chg_RetVol	8443	-0.0006	0.0088	-0.0004	-0.0044	0.0033
Revision	3404	-0.0023	0.0102	-0.0003	-0.0025	0.0009
DMM1	8443	0.0707	0.2564	0	0	0
DMM2	8443	0.3338	0.4716	0	0	1
DMM3	8443	0.4121	0.4922	0	0	1
DMM4	8443	0.1835	0.3871	0	0	0
SIZE	8443	10.1054	1.8519	9.7962	8.8183	10.9850
MTB	8443	2.7112	3.8683	1.8891	1.1655	3.2590
LEV	8443	0.3115	0.1849	0.2812	0.1734	0.4314
ANA_COV	8443	21.9508	10.6067	22	14	29
DISTANCE	8443	4.0874	1.8783	4.5951	2.9444	5.5835
BIG	8443	0.2795	0.4488	0	0	1
PRIOR_DNG	8443	0.1084	0.3109	0	0	0
PRIOR_UPG	8443	0.0707	0.2564	0	0	0
WATCH_NEG	8443	0.0280	0.1648	0	0	0
WATCH_POS	8443	0.0084	0.0913	0	0	0
ABS_PRE_CAR	8443	0.1597	0.2156	0.0796	0.0226	0.2055

Panel B: Comparison between Investment Grade and Non-investment Grade

Variables	Investment Grade (DMM1, DMM2, and DMM3)			Non-Investment Grade (DMM4)			Difference Test	
	Mean	Median	N	Mean	Median	N	Mean	Median
CAR (-1,1)	0.0004	-0.0003	6894	0.0046	0.0023	1549	*3.25* ***	*2.65* ***
Chg_Dispersion	-0.0003	-0.0001	2904	-0.0014	-0.0005	500	*2.93* ***	*4.33* ***
Chg_RetVol	-0.0003	-0.0003	6894	-0.0017	-0.0011	1549	*4.80* ***	*4.85* ***
Revision	-0.0019	-0.0003	2904	-0.0047	0.0000	500	*3.32* ***	*1.40*
SIZE	10.3870	10.0506	6894	8.8524	8.8937	1549	*42.58* ***	*30.67* ***
MTB	2.8155	1.9733	6894	2.2468	1.5201	1549	*4.62* ***	*11.70* ***
LEV	0.2760	0.2560	6894	0.4697	0.4674	1549	*36.01* ***	*34.04* ***
ANA_COV	22.7682	23.0000	6894	18.3131	17.0000	1549	*15.72* ***	*15.21* ***
DISTANCE	4.0787	4.5951	6894	4.1261	4.5951	1549	*0.93*	*0.17*
BIG	0.2409	0.0000	6894	0.4513	0.0000	1549	*15.40* ***	*16.67* ***
PRIOR_DNG	0.0837	0.0000	6894	0.2182	0.0000	1549	*12.21* ***	*15.39* ***
PRIOR_UPG	0.0595	0.0000	6894	0.1207	0.0000	1549	*6.99* ***	*8.50* ***
WATCH_NEG	0.0258	0.0000	6894	0.0374	0.0000	1549	*2.24* **	*2.51* **
WATCH_POS	0.0054	0.0000	6894	0.0219	0.0000	1549	*4.33* ***	*6.46* ***
ABS_PRE_CAR	0.1365	0.0713	6894	0.2628	0.1442	1549	*15.64* ***	*16.65* ***

Panel C: Distribution of rating affirmations by credit rating agency

Credit rating agency	**Dispersion Sample**		**Return Volatility Sample**	
	Number	%	Number	%
Standard & Poor's	342	10.05%	1107	13.11%
Moody's Service	464	13.63%	1253	14.84%
Fitch Service	2579	75.76%	6015	71.24%
Duff & Phelps	19	0.56%	68	0.81%
TOTAL	3404	100%	8443	100%

Table 3
Correlation Matrix

	(2)	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*	*(19)*
CAR(-1,1) (1)	-0.02	-0.09 ***	0.09 ***	-0.02 **	-0.01	-0.01	0.05 ***	-0.03 ***	0.01	0.03 **	-0.02 **	-0.00	0.03 **	-0.01	0.03 ***	-0.03 **	0.00	0.02 *
Chg_Dispersion (2)	1	0.08 ***	0.08 ***	0.02	0.03	0.02	-0.08 ***	0.05 ***	0.06 ***	-0.03 *	0.03 *	-0.03	-0.06 ***	-0.09 ***	0.01	-0.02	-0.01	-0.14 ***
Chg_RetVol (3)		1	0.01	0.01	0.04 ***	0.01	-0.06 ***	0.04 ***	-0.00	-0.03 ***	0.01	0.03 ***	-0.07 ***	-0.08 ***	-0.01	-0.01	-0.02	-0.07 ***
Revision (4)			1	0.02	0.01	0.05 ***	-0.10 ***	-0.01	0.01	-0.07 ***	0.06 ***	0.03 **	-0.04 **	-0.04 **	-0.03	-0.02	0.01	-0.18 ***
DMM1 (5)				1	-0.20 ***	-0.23 ***	-0.13 ***	0.33 ***	0.06 ***	-0.16 ***	0.07 ***	-0.07 ***	-0.00	-0.06 ***	-0.05 ***	0.00	-0.02 *	-0.08 ***
DMM2 (6)					1	-0.59 ***	-0.34 ***	0.37 ***	0.05 ***	-0.19 ***	0.30 ***	-0.09 ***	-0.09 ***	-0.10 ***	-0.06 ***	0.00	-0.04 ***	-0.12 ***
DMM3 (7)						1	-0.40 ***	-0.27 ***	-0.04 ***	-0.06 ***	-0.19 ***	0.12 ***	-0.04 ***	-0.01	0.01	-0.03 **	-0.00	-0.02
DMM4 (8)							1	-0.32 ***	-0.06 ***	0.41 ***	-0.16 ***	0.01	0.18 ***	0.17 ***	0.09 ***	0.03 **	0.07 ***	0.23 ***
SIZE (9)								1	-0.10 ***	-0.26 ***	0.47 ***	-0.31 ***	-0.29 ***	-0.14 ***	-0.12 ***	-0.04 ***	-0.04 ***	-0.28 ***
MTB (10)									1	0.02 **	0.06 ***	0.02	0.05 ***	-0.03 ***	0.01	-0.01	0.00	-0.03 **
LEV (11)										1	-0.10 ***	-0.03 ***	0.14 ***	0.09 ***	0.01	0.00	0.01	0.15 ***
ANA_COV (12)											1	-0.17 ***	-0.11 ***	-0.10 ***	-0.03 ***	-0.02 **	-0.04 **	-0.13 ***
DISTANCE (13)												1	0.08 ***	0.08 ***	0.07 ***	0.04 ***	0.01	0.28 ***
BIG (14)													1	0.23 ***	0.14 ***	0.11 ***	0.06 ***	0.31 ***
PRIOR_DNG (15)														1	-0.10 ***	0.09 ***	0.03 ***	0.23 ***
PRIOR_UPG (16)															1	0.01	0.03 ***	0.08 ***
WATCH_NEG (17)																1	-0.02	0.06 ***
WATCH_POS (18)																	1	0.05 ***
ABS_PRE_CAR (19)																		1

Table 4
Univariate analysis on information uncertainty change around credit rating affirmations

Panel A: Change in Forecast Dispersion

	Full Sample	
	Mean	*Median*
Change in forecast dispersions around rating affirmation	***-0.050*** ***	***-0.015*** ***
Change in forecast dispersion around rating affirmation by prior credit ratings		
Change in forecast dispersion around rating affirmations in DMM1	*-0.012*	*-0.008* **
Change in forecast dispersion around rating affirmations in DMM2	*-0.035* ***	*-0.011* ***
Change in forecast dispersion around rating affirmations in DMM3	*-0.038* ***	*-0.018* ***
Change in forecast dispersion around rating affirmations in DMM4	*-0.145* ***	*-0.047* ***
Difference test between *DMM1* and *DMM4*	*3.39* ***	*3.59* ***
Difference test between *DMM2* and *DMM4*	*2.87* ***	*4.53* ***
Difference test between *DMM3* and *DMM4*	*2.75* ***	*3.16* ***

Panel B: Change in Return Volatility

	Full Sample	
	Mean	*Median*
Change in return volatility around rating affirmation	***-0.056*** ***	***-0.039*** ***
Change in return volatility around rating affirmation by prior credit ratings		
Change in return volatility around rating affirmations in DMM1	*-0.016*	*-0.021*
Change in return volatility around rating affirmations in DMM2	*-0.011*	*-0.015*
Change in return volatility around rating affirmations in DMM3	*-0.045* ***	*-0.042* ***
Change in return volatility around rating affirmations in DMM4	*-0.174* ***	*-0.113* ***
Difference test between *DMM1* and *DMM4*	*4.06* ***	*3.36* ***
Difference test between *DMM2* and *DMM4*	*5.06* ***	*5.01* ***
Difference test between *DMM3* and *DMM4*	*4.00* ***	*3.73* ***

Table 5
The effect of credit rating affirmations on information uncertainty

Panel A: Change in earnings forecast dispersion after affirmations

Dependent Variables = ***Chg_Dispersion Deciles***	*(1)*		*(2)*		*(3)*		*(4)*	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	5.7804	0.00	5.6765	0.00	5.5391	0.00	5.3923	0.00
DMM2	-0.1823	0.42	-0.1252	0.59				
DMM3	-0.2725	0.26	-0.1841	0.49				
DMM4 (=Non-investment grade)	**-0.7773**	**0.01**	**-0.6642**	**0.05**	**-0.5481**	**0.00**	**-0.4872**	**0.02**
SIZE			-0.0049	0.93			0.0074	0.89
MTB			0.0540	0.01			0.0566	0.01
LEV			0.1429	0.74			0.1021	0.81
ANA_COV			-0.0034	0.66			-0.0036	0.64
DISTANCE			-0.0321	0.31			-0.0306	0.34
BIG			0.1151	0.50			0.1136	0.51
PRIOR_DNG			-0.4772	0.02			-0.4861	0.02
PRIOR_UPG			0.1352	0.56			0.1318	0.57
WATCH_NEG			0.1192	0.70			0.1233	0.69
WATCH_POS			0.3020	0.64			0.2819	0.66
ABS_PRE_CAR			-0.1253	0.72			-0.1273	0.71
Industry Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
N	3404		3404		3404		3404	
Adj. R2	3.84%		4.11%		3.85%		4.15%	

Panel B: Change in return volatility after affirmations

Dependent Variable = ***Chg_RetVol Deciles***	*(1)*		*(2)*		*(3)*		*(4)*	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	5.0405	0.00	4.8467	0.00	4.9629	0.00	4.5824	0.00
DMM2	-0.0029	0.98	0.0548	0.66				
DMM3	-0.1262	0.34	-0.1228	0.38				
DMM4 (=Non-investment grade)	**-0.3957**	**0.01**	**-0.3170**	**0.08**	**-0.3203**	**0.00**	**-0.2275**	**0.06**
SIZE			0.0007	0.98			0.0195	0.49
MTB			-0.0122	0.19			-0.0108	0.24
LEV			0.0009	1.00			-0.0402	0.88
ANA_COV			-0.0076	0.08			-0.0066	0.11
DISTANCE			0.0825	0.00			0.0828	0.00
BIG			-0.1650	0.11			-0.1722	0.10
PRIOR_DNG			-0.4679	0.00			-0.4771	0.00
PRIOR_UPG			-0.0862	0.50			-0.0909	0.48
WATCH_NEG			0.1566	0.46			0.1670	0.43
WATCH_POS			-0.4042	0.27			-0.4182	0.25
ABS_PRE_CAR			-0.0582	0.77			-0.0610	0.76
Industry Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
N	8443		8443		8443		8443	
Adj. R2	2.52%		2.99%		2.51%		2.97%	

Table 6
Stock market reaction around credit rating affirmations

Panel A: Descriptive statistics

	Full Sample	
	Mean	*Median*
Stock market reaction to rating affirmation	***0.12%*** ***	***-0.00%*** *
Stock market reaction to rating affirmation by prior credit ratings		
Stock market reaction to rating affirmations *in DMM1*	*-0.18%*	*-0.15%*
Stock market reaction to rating affirmations *in DMM2*	*0.04%*	*-0.07%*
Stock market reaction to rating affirmations *in DMM3*	*0.07%*	*0.04%*
Stock market reaction to rating affirmations *in DMM4*	*0.46%* ***	*0.23%* ***
Difference test between *DMM1* and *DMM4*	*3.74* ***	*2.50* **
Difference test between *DMM2* and *DMM4*	*3.06* ***	*2.53* **
Difference test between *DMM3* and *DMM4*	*2.85* ***	*2.04* **

Panel B: Regression results

Dependent Variables =	*(1)*		*(2)*		*(3)*		*(4)*	
CAR (-1,1)	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	-0.0040	0.39	-0.0023	0.73	-0.0014	0.75	0.0004	0.95
DMM2	0.0025	0.07	0.0028	0.07				
DMM3	0.0029	0.08	0.0023	0.20				
DMM4 (=Non-investment grade)	**0.0075**	**0.00**	**0.0062**	**0.01**	**0.0049**	**0.00**	**0.0038**	**0.02**
SIZE			-0.0001	0.79			-0.0002	0.67
MTB			0.0000	0.70			0.0000	0.77
LEV			0.0011	0.76			0.0013	0.71
ANA_COV			-0.0001	0.14			-0.0001	0.22
DISTANCE			-0.0001	0.70			-0.0001	0.66
BIG			0.0018	0.23			0.0018	0.24
PRIOR_DNG			-0.0016	0.37			-0.0015	0.38
PRIOR_UPG			0.0029	0.14			0.0029	0.14
WATCH_NEG			-0.0057	0.04			-0.0057	0.05
WATCH_POS			-0.0017	0.71			-0.0016	0.72
ABS_PRE_CAR			0.0016	0.58			0.0017	0.56
Industry Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
N	8443		8443		8443		8443	
Adj. R2	0.26%		0.35%		0.26%		0.34%	

Table 7
Earnings forecast revision around credit rating affirmations

Panel A: Descriptive statistics

	Full Sample	
	Mean	*Median*
Earnings forecast revision around rating affirmation	***-0.231*** ***	***-0.031*** ***
Earnings forecast revision around rating affirmation by prior credit ratings		
Earnings forecast revision around rating affirmations in DMM1	*-0.152* ***	*-0.031* ***
Earnings forecast revision around rating affirmations in DMM2	*-0.216* ***	*-0.039* ***
Earnings forecast revision around rating affirmations in DMM3	*-0.172* ***	*-0.022* ***
Earnings forecast revision around rating affirmations in DMM4	*-0.466* ***	*-0.004* ***
Difference test between *DMM1* and *DMM4*	*3.35* ***	*1.03*
Difference test between *DMM2* and *DMM4*	*2.98* ***	*2.29* **
Difference test between *DMM3* and *DMM4*	*3.47* ***	*0.18*

Panel B: Regression results

Dependent Variables =	*(1)*		*(2)*		*(3)*		*(4)*	
Revision_Deciles	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Intercept	6.6404	0.00	8.0837	0.00	6.3544	0.00	7.4365	0.00
DMM2	-0.4067	0.13	-0.4265	0.10				
DMM3	-0.2662	0.32	-0.4696	0.10				
DMM4 (=Non-investment grade)	**-0.4945**	**0.12**	**-0.7651**	**0.04**	**-0.1894**	**0.41**	**-0.2931**	**0.26**
SIZE			-0.1757	0.01			-0.1531	0.02
MTB			0.0025	0.91			0.0082	0.69
LEV			-0.1514	0.78			-0.2409	0.65
ANA_COV			0.0035	0.72			0.0020	0.84
DISTANCE			0.1064	0.00			0.1104	0.00
BIG			-0.2165	0.23			-0.2170	0.23
PRIOR_DNG			-0.1445	0.50			-0.1608	0.45
PRIOR_UPG			-0.2066	0.33			-0.2132	0.32
WATCH_NEG			-0.0613	0.85			-0.0605	0.86
WATCH_POS			0.2247	0.77			0.1781	0.81
ABS_PRE_CAR			0.5884	0.10			0.5820	0.10
Industry Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
N	3404		3404		3404		3404	
Adj. R2	5.85%		6.71%		5.77%		6.63%	

Table 8
The relation between change in information uncertainty and stock market reaction around affirmation announcements

Dependent Variables = ***CAR (-1,1)***	Coeff.	p-value	Coeff.	p-value
Intercept	0.0007	0.95	0.0023	0.82
Chg_Dispersion_Deciles	**-0.0006**	**0.03**		
Chg_RetVol_Deciles			**-0.0009**	**0.00**
Revision_Deciles	**0.0015**	**0.00**	**0.0014**	**0.00**
SIZE	0.0003	0.71	0.0001	0.83
MTB	0.0001	0.80	0.0000	0.85
LEV	0.0001	0.99	0.0011	0.85
ANA_COV	0.0000	0.84	0.0000	0.87
DISTANCE	-0.0004	0.34	-0.0003	0.39
BIG	0.0029	0.24	0.0029	0.23
PRIOR_DNG	-0.0075	0.01	-0.0071	0.01
PRIOR_UPG	0.0037	0.26	0.0034	0.31
WATCH_NEG	-0.0055	0.25	-0.0062	0.19
WATCH_POS	-0.0051	0.44	-0.0060	0.36
ABS_PRE_CAR	0.0069	0.28	0.0098	0.07
Industry Fixed Effects	Yes		Yes	
Year Fixed Effects	Yes		Yes	
N	3404		3404	
Adj. R2	2.14%		2.58%	